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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KNAUSS, SCOTT A

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 05/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/092,551

Applicant(s)

MUKAI, KOHKI

Examiner

Scott A Knauss

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 15-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 8-14 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-14 drawn to an optical switch, classified in class 385, subclass 16.
 - II. Claims 15-24, drawn to an optical multiplexer, classified in class 385, subclass 14.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as subcombination and combination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because it can be used with other types of switches besides multimode interferometers. The subcombination has separate utility such as an optical switch in optical communications.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Donald Hanson on 5/7/03 a provisional election was made without traverse to prosecute the invention of group I, claims 1-14. Affirmation of this election must be made by applicant in replying to this Office action.

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Claims 15-24 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2003/0002797 (Chu et al).

Regarding claim 1 Chu discloses in fig. 3a an optical switch with all the limitations set forth in the claim, including:

A first multimode interferometer (MMI) #22 having a first input port #2, to which an optical signal is applied, and at least two output ports #3,#4

A first optical waveguide (SOA #10) connected to one of the first output ports selected from the output ports, and allowing a light exiting from the one or plural first output ports to propagate therethrough, the first waveguide having a refractive index changed in response to a trigger signal (A) externally applied (see [0043], lines 1-5)

A second optical waveguide #12 connected to one second output ports selected from the output ports, and allowing light from a second output port to propagate therethrough.

A trigger (source of input light A) for supplying, to the first optical waveguide #10, the trigger signal for changing the refractive index of the second waveguide.

Regarding claim 2, the first optical waveguide is a semiconductor optical amplifier (SOA)

Regarding claim 3, Chu discloses a second MMI #24 having at least two input ports #1,#2 and a first output port #3,#4, the input ports being connected respectively to an output end of the first optical waveguide and an output end of the second optical waveguide.

Regarding claim 4, the second MMI changes the intensity of an optical signal exiting from the first output port #3 (see the table in fig. 3c, which shows intensity at output C being changed from 1 to 0 and vice-versa) when the refractive index of the first waveguide is changed, and the phase of the optical signal traveling through the first waveguide is delayed from the phase of the signal traveling through the second waveguide (see [0043], lines 1-5, [0046])

Regarding claim 5, the second MMI has a second output #4

Regarding claim 6, the second MMI changes the intensity of an optical signal exiting from the first output port #3 and second port #4 (see the table in fig. 3c, which shows intensity at outputs C and D being changed from 1 to 0 and vice-versa) when the refractive index of the first waveguide is changed, and the phase of the optical signal traveling through the first waveguide is delayed from the phase of the signal traveling through the second waveguide (see [0043], lines 1-5, [0046])

Regarding claim 7, it is apparent from fig. 3a that the second MMI has a shape line symmetrical to the first MMI about an imaginary straight line connecting middle points of the first and second waveguides.

Allowable Subject Matter

7. Claims 8-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 8 in particular, the prior art fails to teach or suggest an optical switch as set forth in claim 1 wherein the trigger comprises a pair of reflecting mirrors arranged in an opposed relation with the first waveguide in between so that a control light is multiple reflected between the pair of reflecting mirrors.

Regarding claim 9-14, the prior art fails to disclose a switch as set forth in claim 1 wherein the trigger comprises a third MMI having a first input port to which a control light is applied, a third waveguide for introducing a light having exited from a second output port of the third MMI to a second input port of the first MMI, and a combining element to combine a light having exited from a first output port of the third MMI with the optical signal, and introducing a combined light to the first input port of the first MMI.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

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US 2002/0101293 (Shibata et al) and US 2003/0002117 (Naik et al) disclose alternate optical switching devices using MMI's and control light signals to effect optical switching.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Knauss whose telephone number is (703) 305-5043. The examiner can normally be reached on 9-6 Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308 - 4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Scott Knauss

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sak
May 7, 2003


HEMANG SANGHAVI
PRIMARY EXAMINER